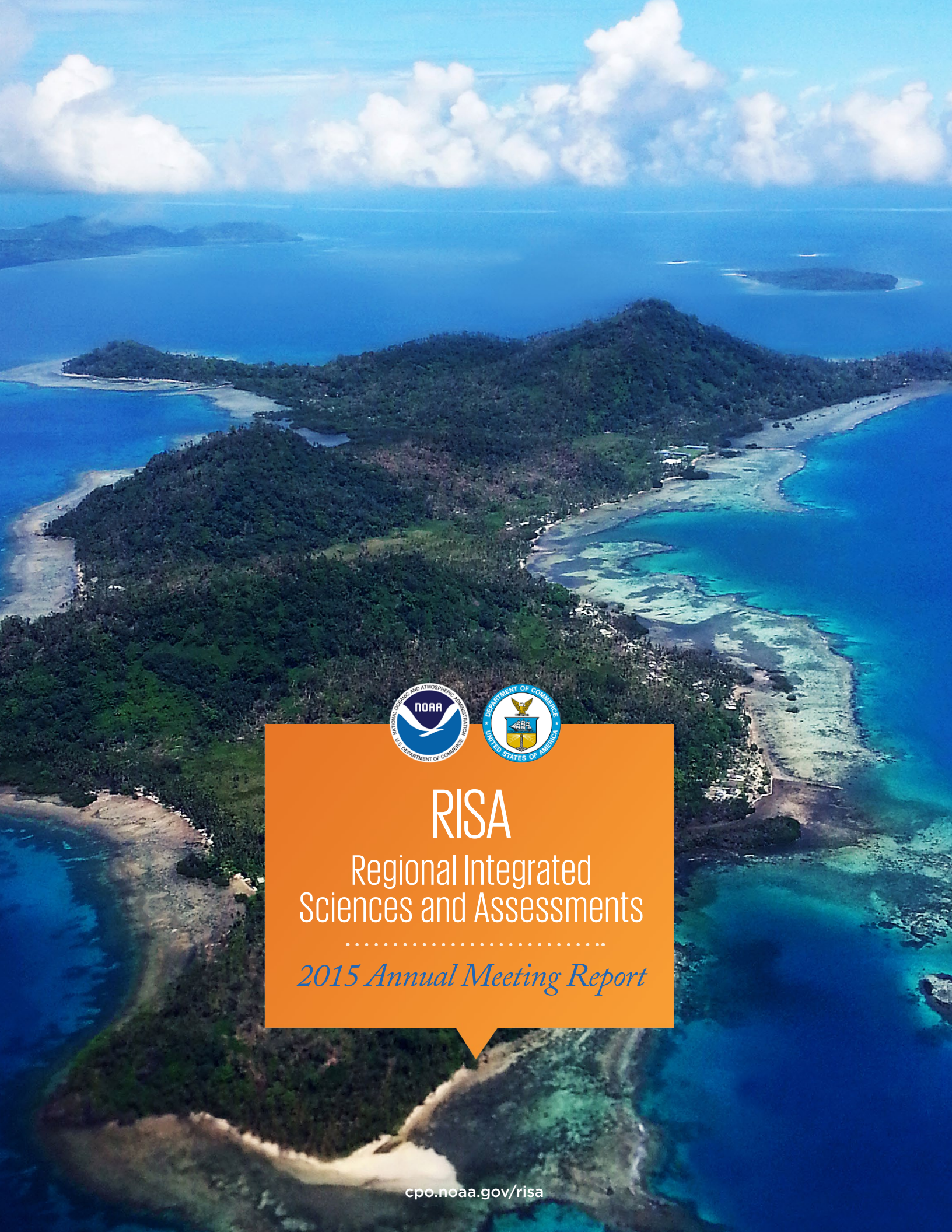


RISA

Regional Integrated Sciences and Assessments

2015 Annual Meeting Report

cpo.noaa.gov/risa

CONTENTS

Cover Photo By: Victoria Keener
Damage is still visible on the island of Chuuk in the Federated States of Micronesia, months after Typhoon Maysak killed at least 5 people in March of 2015. El Nino events increase the numbers of typhoons that develop in the Pacific Basin.

The view from Pacific RISA's Mt. Alava weather station. This spread-Photo By: Chris Schuler

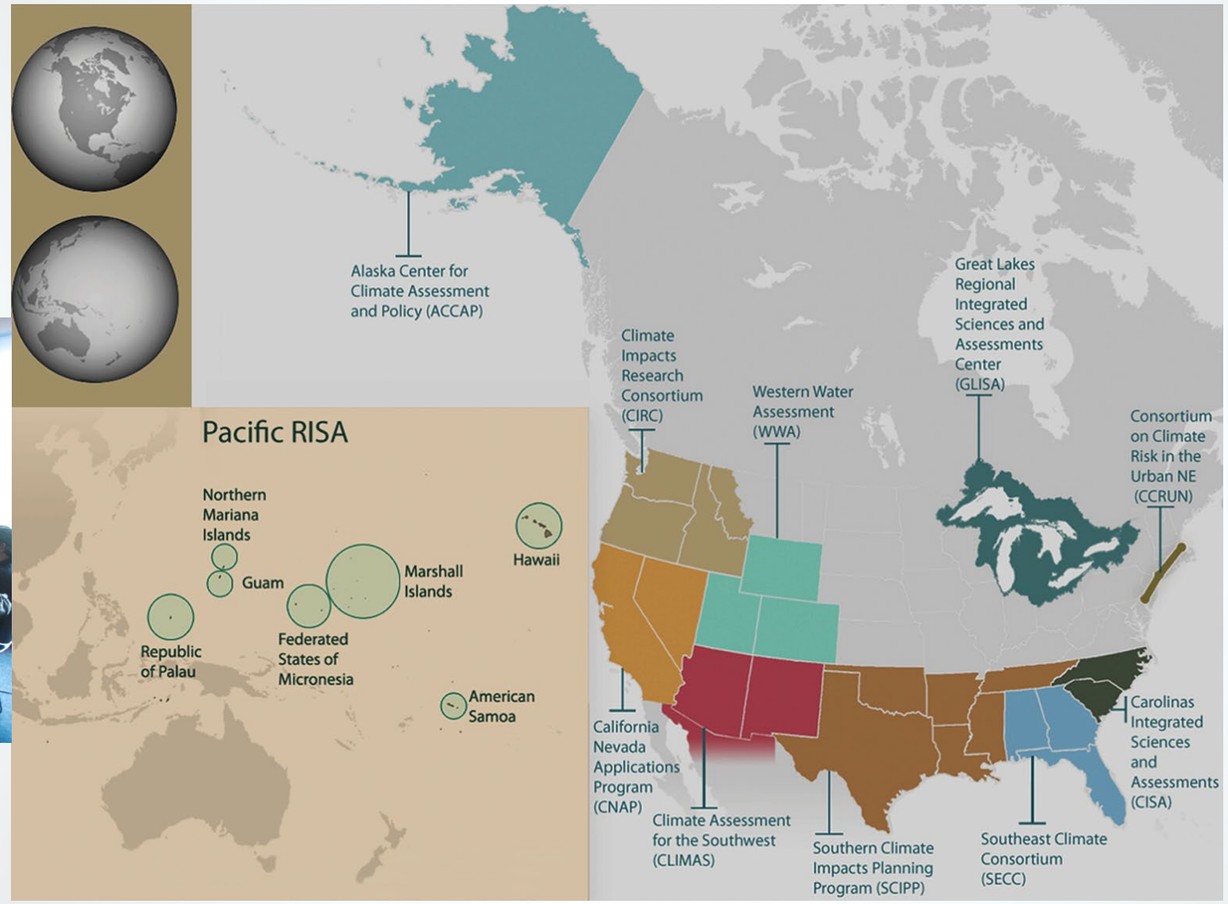
THE RISA PROGRAM

The National Oceanic and Atmospheric Administration's (NOAA) Regional Integrated Sciences and Assessments (RISA) program supports interdisciplinary research teams in regions around the United States that help expand and build the capacity of those seeking to prepare for and adapt to climate variability and change. As of the 2015 Annual Meeting, the RISA Program supported eleven regional teams (Figure 1). The RISA program sits within the Climate and Societal Interactions division of NOAA's Climate Program Office.

RISA teams work with stakeholders and decision-makers to co-produce climate knowledge that supports decisions. This process takes many forms, but in all of them engagement and a focus on partnerships with stakeholders and decision-makers is key. RISA teams conduct research and engage with stakeholders on climate-related issues of importance in their region. Recent themes of RISA work have included understanding and responding to extreme events, building and sustaining networks of regional partnerships, cutting-edge research on the impacts of climate and community resilience, and understanding, monitoring, and preparing for drought impacts. RISA teams work with a wide range of stakeholders across sectors including, among others, water resource management, urban planning, coastal ecosystem management, and public health. Throughout its twenty year history, the RISA program has pioneered many aspects of interdisciplinary and transdisciplinary research and engagement around climate impacts and adaptation; the 2015 RISA Annual Meeting highlighted much of the progress that RISA has made in building adaptive capacity within the United States.

CISA is supporting a citizen science effort to improve drought impacts monitoring and reporting using tools developed by the Community Collaborative Rain, Hail, and Snow (CoCoRaHS) network. Amanda Brennan shares project information with Master Naturalists during an in-person training at the Old Santee Canal Park in April 2014.
Photo by: Janae Davis

THE RISA PROGRAM



As of the 2015 Annual Meeting, the RISA network consisted of 11 regional teams, shown here.

OVERVIEW OF THE MEETING AND EXECUTIVE SUMMARY

From January 13th to 15th, 2015, NOAA hosted the 5th Annual Meeting of the RISA program. RISA scientists and partners gathered in Charleston, South Carolina to share information and promote integration across the RISA network. These gatherings have come to be highly valued across the RISA network and by others for bringing together the community of RISA scientists.

A focus of the meeting this year was to broaden our engagement with entities outside of the RISA network to share lessons learned across the program and build stronger partnerships in support of regional climate adaptation. Participants included representatives from each of the RISA teams, representatives from every NOAA Line Office, federal agencies, including US Departments of Agriculture, Interior, and Health and Human Services (Centers for Disease Control), the US Global Change Research Program, state governments, the private sector, and non-profit organizations (Appendix A).

2014 Carolinas Climate Resilience Conference
Photo By: Kim Rodgers

Topically, the meeting was divided into three themes developed through conversations at the Climate Program Office and with the RISA network. Within each theme, RISA teams submitted proposals to lead sessions focused on specific areas (see Appendix B for full agenda).

- **Strengthening Usable Science Practice**
  - Training the next generation of RISA researchers
  - Learning networks and evaluation
  - Usable Science
- **Exploring Integration**
  - Coastal climate resilience
  - Climate and health
- **Regional Climate Partnerships**
  - Why regional partnerships?
  - Models for partnerships: NIDIS and Digital Coast
  - Regional and topical breakout sessions

Strengthening Usable Science Practice

Developing and applying usable science in planning and decision-making has been a theme of RISA work since the program's inception in the mid-1990s. As the RISA program has grown and matured great strides have been made in our understanding of how best to do this. For the past 20 years, the RISA teams have been working directly with stakeholders to develop usable climate science for natural resource management, agriculture, water, urban planning and other sectors. This session focused on several aspects of this challenge. The confluence of an

OVERVIEW OF THE MEETING AND EXECUTIVE SUMMARY

increasing need for climate research that is relevant for decision-making and graduate students who are interested in pursuing non-academic career paths has created an opportunity for the RISAs to pioneer new approaches to post-graduate education and professional training. In "Training the next generation of RISA researchers," panelists highlighted RISA approaches to post-graduate training focused on usable climate research as well as models for professional development that other organizations use. The "Learning Networks and Evaluation" session focused on evaluation methods and approaches from within and outside of the RISA network that can be used to identify and evaluate policy for science (i.e., how funding for climate research provides public value) and science for policy (i.e., how climate research is used to influence policy decisions). Finally, the session on "Usable Science" discussed two overarching themes: the challenges and opportunities in (1) engaging in usable science research and (2) in making information useful through communications tools such as visualizations and narratives.

Exploring Integration

An important purpose of the RISA Annual Meeting is to share information across the RISA network on emerging or existing themes or areas of research. The Exploring Integration session aimed to foster communication across RISA about research in coastal climate resilience and the links between climate and health. RISA teams work with stakeholders and decision-makers in a wide variety of sectors, so coming together around specific issues is a productive way to share information. In the Coastal Climate Resilience session, participants from RISA and non-RISA entities presented on integrated coastal research and engagement and discussed opportunities for moving forward in these areas of research. Likewise, the Climate and Health session participants discussed ways in which the climate, adaptation, and health communities are collaborating to address the health risks associated with extreme events, climate variability, and climate change.

Regional Climate Partnerships

Over the past few years, the landscape of federal entities involved in regionally-based climate science and service networks has expanded. Most notably, the Departments of Interior and Agriculture have established programs that are complementary to RISA—the DOI Climate Science Centers, USFWS Landscape Conservation Cooperatives, and USDA Regional Climate Hubs. At the national level, leads of these programs work to coordinate and communicate the value of having increased capacity in regions to assist in climate preparedness and resilience. The "Regional Climate Partnerships" theme at the RISA Annual Meeting aimed to build upon this progress and highlight additional models for partnership-driven efforts.

Another aspect of this theme was a breakout session designed as an opportunity to explore in depth many of the concepts on partnerships and collaborations discussed during the first day's panels on Regional Partnerships and Learning Networks. Key lessons from the session included recognizing the need for these face to face meetings as a first step in building partnerships; an interest in forming a disaster response working group for RISA; and a recognition that the climate adaptation field is rapidly changing and RISAs and other federal agencies must work to clarify their roles and services to both constituents and policymakers.

STRENGTHENING USABLE SCIENCE PRACTICE

The RISA program has a long history of developing methods and approaches for carrying out usable science, and this theme at the RISA Annual Meeting highlighted the progress that RISA has made in this area, as well as new directions in training and evaluation.

Learning networks and evaluation

Session Chairs: Tamara Wall (California-Nevada Applications Program), Melissa Finucane (Pacific RISA), Victoria Keener (Pacific RISA), and Laura Brewington (Pacific RISA)

Invited Speaker: Meg Hargreaves (Mathematica Policy Research)

Session Summary

Theory based evaluation is a strong programmatic tool to improve use-inspired research outcomes. While individual RISA teams have been working in parallel to develop and implement evaluation metrics, they have made enough progress that it seems possible to move towards developing a holistic set of RISA-wide evaluation principles that attempts to outline a complex systems evaluation framework. This session focused on presenting an overview of the evaluation methods and theory that can be used to evaluate a complex system of climate research and evaluation methods that are used within the RISA program. The last part of the session was an interactive exercise for meeting participants to consider how theory-based evaluation could be applied at a programmatic, project, and process level within their own programs or agencies.

Pacific RISA partners with American Samoa Power Authority (ASPA) to install and maintain a new hydro-meteorological monitoring network on the island of Tutuila. Five stations were installed in summer 2015. The stations record rainfall, temperature, relative humidity, wind speed and direction, and solar radiation. Pictured: Chris Shuler and Katrina Mariner, ASPA hydrogeologist, installing a station on the western tip of the island.
Photo By: Chris Schuler

Melissa Finucane and Victoria Keener (Pacific RISA) provided an overview of evaluation methods and approaches used in the RISA community, and a case study of how the Pacific RISA has incorporated programmatic, project-level, and process evaluation approaches. They noted the variety of evaluation methods used across the RISA teams as a positive aspect of the RISA program, as it allows for each RISA to identify and meet their own evaluation needs.

STRENGTHENING USABLE SCIENCE PRACTICE

Meg Hargreaves (Mathematica) spoke on the challenges of evaluating complex systems at multiple scales. In her talk, Meg looked at 10 factors that affect the level of evaluation complexity (Box 1) and suggested using a nested rapid evaluation approach.

To help synthesize the session, Tamara Wall (CNAP) asked the meeting participants to work in small groups, organized by agency or program, to consider how theory-based evaluation could be utilized in their agency or program, what they would want to evaluate, challenges, and what shared outcomes might exist between climate-research entities such as the DOI Landscape Conservation Cooperatives (LCCs) and Climate Science Centers, USDA Climate Hubs, and the RISA program.

The Fonte Dam was the first US built water control structure in Guam.Constructed in 1910, it and other structures help to minimize flash flood damage associated with typhoons. Fewer, but more intense typhoons are predicted to impact Guam under future climate conditions.
Photo By: Victoria Keener

In summary, there emerged from the session several key themes:

- There is no one right way to do evaluation, especially not in the area of user-inspired climate science, which is a highly complex system that works at multiple scales, from the individual project through national level programs. Or, as Meg Hargreaves stated in her presentation "The right method (or combination) addresses the goal of the evaluation and captures the complexities of the intervention and its organization and environmental context."
- While there is a perception that evaluation is expensive—both in terms of time and money—the presenters noted that this was not always the case. They emphasized that effective evaluation could be integrated successfully into part of the research practice. The decision to do a full, external evaluation to evaluate "collective impact" across systems or sectors should be a strategic decision—only some of the evaluation needs to be at this level—much else can be integrated into the daily work flow of the team.
- Evaluation findings can be highly leveraged across multiple funding sources and help inform partners and collaborators, making it a beneficial shared resource as well as a collaborative tool.
- Rapid evaluation methods can be useful in identifying "course corrections" in an adaptive action/management cycle (M. Hargreaves).

Recommendations

Programmatic:

- Agencies and programs involved in applied or user-inspired climate science research can identify shared outcomes that can be evaluated across programs, as well as program-specific outcomes.
- Agencies and programs involved in applied or user-inspired climate science research should work closely together to develop a common framework for evaluation metrics that can be modified as needed for individual programs, projects, and deliberative co-production research processes.

Process:

- For agencies or programs considering evaluation, first define what elements need to be evaluated and at what scale (individual project, program, or processes).
- Identify what can be evaluated internally and what requires an external evaluator.

Ten factors affecting the level of evaluation complexity:

1. Situational dynamics
2. Intervention complexity
3. Governance structure
4. Theory of change
5. Execution strategy
6. Scale of outcomes
7. Sequence, scale, and timing of expected results
8. Evaluation purpose
9. Reporting and use of evaluation findings
10. Evaluation methods

STRENGTHENING USABLE SCIENCE PRACTICE

Training the next generation of RISA

Session Chairs: *Dan Ferguson and Connie Woodhouse (University of Arizona/ Climate Assessment for the Southwest)*

Speakers: Gregg Garfin (University of Arizona/CLIMAS), Jeff Andresen (Michigan State University/GLISA), Dan Ferguson, Connie Woodhouse

Session summary

The RISA approach of use-inspired climate research developed through engagement with decision-makers is now commonly recognized as an important means for helping inject research into decision-making processes. However, post-graduate student training traditionally follows a model of academic inquiry and research that provides little or no opportunity for students to develop skills and experiences necessary for this kind of use-inspired, societally-engaged research. This session covered a number of approaches that have been developed to meet the needs of post-graduate students as well as the needs of professionals who were trained in a more traditional, disciplinary-focused academic mode, but who are in need of a broader skill set.

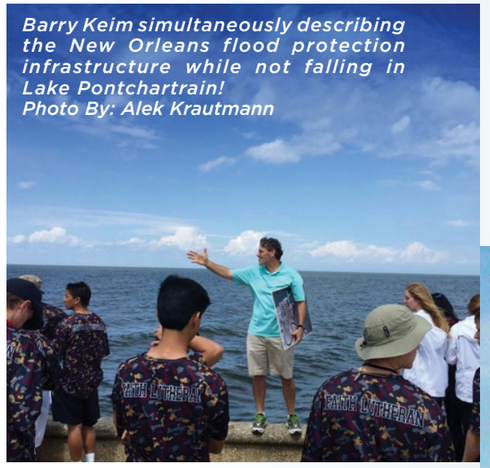
This session was structured with four presentations followed by discussion. In the first presentation, Gregg Garfin reported on preliminary results of a study that focused on skills and knowledge that the "first wave" of climate scientists who carry out use-inspired research feel are critical. His talk also reviewed several examples of training to support scientists who want to be more engaged with the broader society including a model from Cooperative Extension, the field of public health, the Leopold Leadership Program, National Conservation Training Center, and the emerging field of ecohydrology.

The next three talks presented specific programs that RISA teams have developed to train post-graduate students. Jeff Andresen discussed the University of Michigan/GLISA Masters of Engineering in Applied Climate and undergraduate curriculum in Climate Impacts Engineering. These programs are designed to accelerate the use of climate knowledge in design, planning, and management and to train climate science translators. By helping set up practicums, GLISA provides opportunities for these students to work on societally-relevant climate research questions. Dan Ferguson (University of Arizona/CLIMAS) described a new CLIMAS Climate & Society Fellows program that provides a small amount of funding for UA graduate students to pursue a 1 year project in either use-inspired research or outreach. Though the program has only funded two cohorts so far, the Climate & Society Fellows are demonstrating the value of providing support for graduate students to design and carry out projects inspired by user needs so that they gain hands-on skill and experience in engaged research.

Finally, Connie Woodhouse (University of Arizona/CLIMAS) presented information about the Connecting Environmental Science and Decision Making graduate degree certificate and the core graduate seminar for the certificate both of which are designed to help students develop into professionals who are comfortable working with both scientific and decision-making communities in a variety of capacities.

Several themes emerged from the session, including:

- **New models for training experts.** We need more training opportunities for people interested in developing Masters- and PhD-levels of expertise to work on climate challenges, but who are not interested in academically oriented, tenure-track careers. These training pathways are necessary for both post-graduate students and career professionals who find they lack some of the skills important for connecting research to decision-making. Subsets of the existing RISAs and the Department of Interior Climate Science Centers (CSCs) have begun to develop these new pathways. There are also potential opportunities to partner with professional societies to develop training opportunities.



Barry Keim simultaneously describing the New Orleans flood protection infrastructure while not falling in Lake Pontchartrain!
Photo By: Alek Krautmann

- **RISAs and the CSCs can be training grounds for use-inspired researchers.** The University of Michigan Applied Climate masters degree, the CLIMAS Fellowships, and the UA Graduate Certificate in Connecting Environment Science and Decision Making, all leverage RISA expertise for mentoring or offer mutually beneficial relationships in which research projects contribute to the mission of the RISA program. The Northwest CSC and the Southeast CSC have both also made substantial commitments to post-graduate student training.
- **Post-Graduate students interested in nonacademic careers would benefit from peer groups.** Because much post-graduate training is still focused on preparing for a tenure-track academic career, students interested in working on climate challenges outside of academia can find themselves isolated and without a cohort of like-minded peers.
- **Balancing the tension between training that builds depth of knowledge and breadth of skills is difficult.** A number of fields (across the social, physical, and policy sciences, engineering, planning, etc.) have rigorous core competencies that require focused training leading to accreditation. Students interested in pursuing careers in these fields, but who also are interested in connecting research to decision-making must find ways to develop a range of skills that may fall outside of those field-specific competencies.

STRENGTHENING USABLE SCIENCE PRACTICE

Recommendations

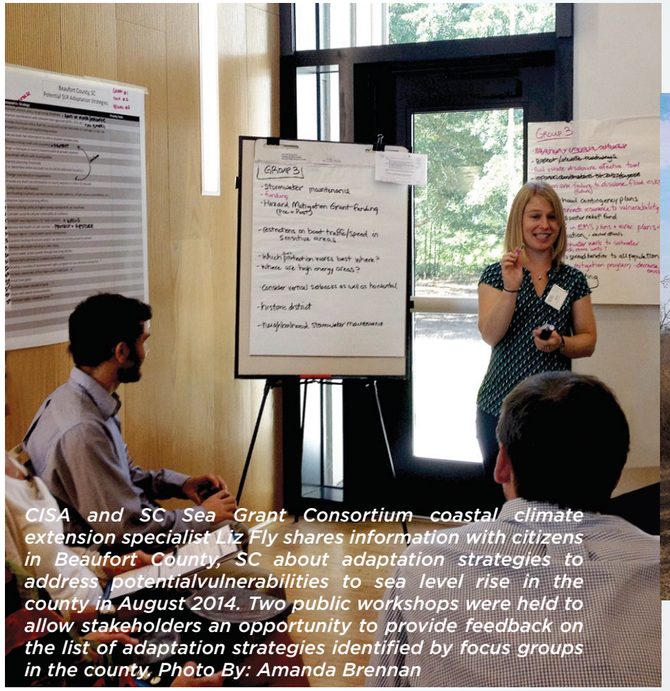
- Share resources on programs, curriculum, syllabi, through a RISA website.
- Enable and promote student interaction among those involved in RISA-type research through a student and/or early career scientist listserv or other mechanism that allows students to connect with like-minded peers.
- Developing short courses for graduate students in programs that do not provide opportunities for RISA-type training and professionals who cannot enroll in semester-length courses could help fill the training gap discussed in this session.
- Developing a set of core tenets for training the next generation of use-inspired climate researchers would be a valuable starting point for broadening the reach of the work that was discussed in the session. These could also assist students or programs with more prescribed requirements to identify opportunities to gain experience in these areas.

The Daniel Island Connector in Charleston, South Carolina.
Photo By: Chandler Green

Usable Science

Session Chair: *Elizabeth McNie (University of Colorado/Western Water Assessment)*

Speakers: Dan Ferguson (University of Arizona/CLIMAS), Denise Lach (Oregon State University/Climate Impacts Research Consortium), Hal Needham (Louisiana State University/Southern Climate Impacts Planning Program), Elizabeth McNie



CISA and SC Sea Grapt Consortium coastal climate extension specialist Liz Fly shares information with citizens in Beaufort County, SC about adaptation strategies to address potentialvulnerabilities to sea level rise in the county in August 2014. Two public workshops were held to allow stakeholders an opportunity to provide feedback on the list of adaptation strategies identified by focus groups in the county. Photo By: Amanda Brennan

Session summary

The presenters in this session discussed examples of usable science conducted across the RISA network, highlighting some of the challenges and opportunities to improve and expand the practice of usable science that RISAs and others conduct.

Dan Ferguson drew on outcomes from a project engaging climate researchers and water resource practitioners to understand how they collaborate.[1] In this talk, he identified fundamental epistemic differences that exist between the cultures of science and those of nonscientists who can rely on research to inform decision-making. This mismatch presents one of the larger barriers to the practice of usable science. To overcome some of these mismatches the speaker identified a set of heuristics to guide collaborations, including the need for more robust communication to build intersections between producers and users of research, the importance of mutual respect, and the role that information brokers can play in collaborations. Effective communication helps to build collaboration and epistemic pluralism which helps inform the implementation of research.

The second speaker, Denise Lach, identified several challenges related to the production and use of large amounts of data (petabytes) and how to harness such data to produce information that can be used by stakeholders. The researchers developed the ENVISION platform that is designed to incorporate big data into scenarios in order to communicate complex information. Creating various storylines and scenarios

[1] http://www.climas.arizona.edu/publication/report/linking-environmental-research-and-practice

STRENGTHENING USABLE SCIENCE PRACTICE

enables stakeholders to visualize the information in ways that are relevant to the problems they seek to solve. Producing the information in the form of storylines and visualizations not only improves transparency and thus trust between researchers and stakeholders, but also provides a mechanism for researchers and stakeholders to engage more directly with the other.

Hal Needham, the third speaker, also discussed the challenges of producing information that can be used by decision-makers, specifically, the challenges related to communicating extreme events. Communicating and translating information about storm surges has been difficult to do, especially in places that haven't experienced these extremes in recent memory. The speaker uses histograms and bar charts to explain the frequencies and extremes of historical storm surges along the Gulf Coast that enabled decision-makers to identify additional information needs. He also introduced SURGEDAT, a mapping and visualization tool that is web-based.[2] The SURGEDAT tool catalogues storm surge from historical events and is designed to be simple and easy to understand.

Workshop host and CISA collaborating investigator John King (NC State University) shares information about the changing ecology of Alligator River National Wildlife Refuge with local stakeholders. Fewer pine trees are seen in the landscape to the left of the road as this area transitions from pond pinepocosin to marsh. Photo By: Amanda Brennan

Finally, Bets McNie discussed the need to rethink how we design research if our goal is to produce usable information to inform decision-making. Science policy needs to be reconsidered to better inform the discussion, deliberation, and implementation of research. The typology of research activities and attributes that Bets presented can be used to better understand what research is and how it is done. In this typology, research attributes are placed on a spectrum from science-centric values to user-centric values. Research programs and projects can be situated on the spectrum resulting in a more robust and nuanced characterization of research.

Recommendations

- The RISA program should continue to support the development of and experimentation with visualization software and tools to communicate relevant information to stakeholders.
- The RISA program should continue to support the development of research focused on understanding how to shape research design and implementation aimed at producing useful information.
- The RISA program should continue to support the development of evaluation programs for RISAs and their research efforts.

[2] http://surge.srcc.lsu.edu/

REGIONAL CLIMATE PARTNERSHIPS

This theme considered different models of partnerships and determined key elements and challenges of building and maintaining partnerships. The first panel drew on examples from the International Research and Applications Project's (IRAP's[3]) work in countries outside of the U.S. and from a Regional Climate Center's (RCC's) efforts to communicate through observations and data. For the second panel, we picked two models for which partnerships are key elements: the National Integrated Drought Information System (NIDIS) and Digital Coast. Finally, the working group session allowed meeting participants to have focused conversations about regional or cross-regional issues and coordination.

Why regional partnerships?

Session Chairs: *Adam Parris (NOAA CPO, RISA), Sarah Close (NOAA CPO, RISA), Caitlin Simpson (NOAA CPO, RISA), Claudia Nierenberg (NOAA CPO, NIDIS)*

Speakers: Kelly Redmond (CNAP), Jim Buizer (IRAP), Lisa Goddard (IRAP)

Session summary

The first panel on regional partnerships focused on discussing experiences from the perspective of researchers who have vast experience in this area. Jim Buizer and Lisa Goddard talked about their experiences in IRAP of working on international climate adaptation and what it takes to nurture partnerships and ensure that they are productive. They pointed out that partnerships are critical to providing services, and that maintaining partnerships requires resources, time, and face-to-face encounters. Funding agencies need to recognize this. Kelly Redmond spoke from his experience in partnership-driven enterprises over the years, including RISA, Regional Climate Centers, CSCs, and more. Kelly emphasized that we need scientists who want to communicate, and we need to search for the natural communicators. He also spoke about the role of observations in science communication and translation, noting that observations are perceived as "real" by decision-makers and the general public, while forecasts are perceived more as speculation. The discussion following these presentations continued on these themes of communication and partnerships, in particular the need to devote time, effort, and resources to sustaining partnerships.

Oregon State University graduate student talks with stakeholder in Tillamook County, Oregon for CIRC's Envision Tillamook project. Photo By: Pat Corcoran

[3] Like RISA, IRAP is a program in the Climate and Societal Interactions division of CPO: http://cpo.noaa.gov/ClimatePrograms/ClimateandSocietalInteractions/IRAPProgram.aspx

REGIONAL CLIMATE PARTNERSHIPS

The second panel in the Regional Partnerships theme looked at models for which partnerships are key: the National Integrated Drought Information System (NIDIS), and the Digital Coast Partnership. Panelists were involved in these partnerships in various capacities, providing a rich set of experiences from which to draw. Hope Mizzell discussed the partnership of the South Carolina State Climatologist office (her office), the CISA RISA team, and NIDIS in dealing with drought in the Carolinas. They have undertaken workshops, scoping interviews, drought tools, a state of the knowledge report, and worked with local community members to do citizen science condition monitoring for drought conditions. Evaluating the information provided by citizen scientists is very important for improving monitoring systems, and this partnership has helped identify challenges and how drought monitoring and planning can be improved.

Francis Beidler Forest Boardwalk Photo By: Chandler Green

Following the discussion of NIDIS, Lori Cary-Kothera and Jim Schwab talked about NOAA's Digital Coast partnership— Lori from the perspective of the NOAA office that administers Digital Coast, and Jim from the perspective of one of their core partners, the American Planning Association. The Digital Coast partnership has grown into a unified voice for coastal issues; providing information that coastal managers need to address these issues. From the beginning, Digital Coast was built in collaboration with their partners, and Lori discussed some of the lessons learned from that process.These included the importance of vision and purpose, the value of having diverse stakeholders and partners for expanding and understanding multiple perspectives, the value of meeting in person and developing relationships, and the importance of listening. Jim Schwab drew from his experience at the APA in bringing the voice of their members to the Digital Coast partnership, stating that you cannot assume that people are using the information and material from federal agencies. It is important to find out if and how they're using it by conducting needs assessments to determine what is useful, what isn't, what was effectively communicated and what wasn't, and what kinds of challenges users faced attempting to use the information.

Many themes and conversations emerged through both of these panels and the discussions that followed. In particular, many noted the emerging role of the private sector and foundations in this arena, as well as the expanding landscape of federal entities leading to greater need for productive partnerships.

REGIONAL CLIMATE PARTNERSHIPS

Common themes for regional partnerships, adapted from Regional Partnerships presentations.

Why partner?

- Many boundaries that need bridging
- Complementary skills and complementary missions, common goals
- Share resources; efficiencies of scale
- Reduce duplication of efforts
- Improve products and outcomes
- Increase use and availability of information

Critical ingredients of partnerships

- Trust, understanding, incentives for each and every side
- If diverse stakeholders, sometimes need to get all stakeholders together
- Maintain partnership over time to develop trust
- Listening: critical to credibility to bring partners in and listen to their perspectives
- Iterative evaluation approach

Challenges

- Critical ingredients can also be challenges (e.g. developing trust, understanding, etc.)
- Resources devoted to sustaining partnerships
- Communication and engagement of partners when separated by large distances
- Different cultures
- Capacity gaps

Regional Partnerships Working Groups

Session Chairs: Session Chair: Beth Gibbons (GLISA)

Session summary

This session focused primarily on providing an opportunity for teams to form around either regionally relevant climate impacts or cross regional impacts. The session began with a brief overview of the key lessons from the Regional Partnerships panels and goals for the working group session. This summary synthesizes the working groups as a whole; summaries for each discussion group can be found in Appendix C (Figure 3).

REGIONAL CLIMATE PARTNERSHIPS

Discussion group options included:

- Coastal vulnerability and meeting the needs of Indigenous communities (cross-regional)
- Extreme weather and climate events (cross-regional)
- Coordinating science and communication on future climate information (cross-regional)
- Drought preparedness and information (cross-regional)
- Drought preparedness and information (California-Nevada and surrounding areas)
- Southeast region coordination
- Loss of winter (Great Lakes region)

Beth Gibbons began this session by presenting a summary of the lessons garnered from the Regional Partnerships panel and discussion preceding this session, and then opened the discussion up to others. From this discussion emerged a robust list of the key ingredients and lessons for partnerships:

- Collaborations must be among equals.
- Everyone involved must want to be part of the collaborations.
- Communication is critical.
- Diversity of partners leads to diverse outcomes.
- Collaborations need clear goals, defined responsibilities.
- Collaborations are most effective, especially where resources are limited, when partners have complementary skillsets.
- Partnerships are built on trust and the process of creating trust is continuous.
- Those involved should enter into collaborations or partnerships prepared to put in resources and recognizing that no one party has all the resources, but also that resources can be more than just monetary contributions. Time and expertise are important resources to value in these interactions.

Recommendations from Panels and Working Groups

- Continue creating and supporting opportunities for cross-agency collaboration and discussion.
- Set-up a cross-RISA disaster response team.
- Ensure resources posted to the Climate Resilience Toolkit (toolkit.climate.gov), Digital Coast (http://coast.noaa.gov/digitalcoast/), Climate.gov, and other websites are cross-linked when appropriate.
- Find ways of writing proposals where time for partnerships is adequately resourced and valued by funding agencies.

EXPLORING INTEGRATION

RISA Annual Meetings offer a chance for researchers to share what they are learning from their research and discuss emerging areas of research. The Exploring Integration theme of the RISA meeting aimed to bring people together around two areas of research that many RISA teams are pursuing: coastal climate resilience and the connections between climate and health. These were held as concurrent sessions, with presentations and discussion time in both.

Coastal climate resilience

Session Chair: Shelby Krantz (Southeast Climate Consortium)

Speakers: Liz Fly (CISA, South Carolina Sea Grant), Paul Conrads (USGS South Atlantic Water Science Center), Jessica Bolson (SECC), Shana Jones (SECC), Troy Hartley (Virginia Sea Grant), Phil Mote (CIRC), Sarah Trainor (ACCAP), Mary Culver (NOAA Office for Coastal Management)

Session Summary

The Coastal Climate Resilience session featured eight panelists who spoke about examples of interdisciplinary coastal work, successes and challenges in engaging stakeholders, and future opportunities for RISA to improve resilience of coastal resources to climate variability and change.

Each speaker gave an overview of their projects, and then described lessons learned and important insights for future work. Projects focused on integration of climate knowledge and resource management, stakeholder engagement and participation, key communities to engage, and effective pathways to disseminate coastal climate information. Each speaker touched on opportunities and next steps for RISAs with regard to ongoing and future coastal climate stakeholder engagement initiatives. Mary Culver concluded the session by identifying some common threads that ran through all of the presentations. Commonalities included discussion of motivations for stakeholder involvement and different ways to involve stakeholders; active engagement and scenario planning as a way to address uncertainty; and the importance of networks.

Recommendations

Recommendations are based on a dynamic question and answer session, which highlighted a number of areas where current coastal resilience work could improve.

- Future RISA efforts should further evaluate the information needs of their diverse stakeholders in order to provide information in a format that is both trusted by the stakeholders, and directly related to their individual needs. Everyone involved must want to be part of the collaborations.
- RISA groups should collaborate to better communicate existing efforts in coastal areas, what we are learning from this research, and specific properties that make coastal communities unique and worthy of attention and resources.

EXPLORING INTEGRATION

Climate and health

Session Chairs: Kirsten Lackstrom (Carolinas Integrated Sciences & Assessments)

Speakers: Paul Schramm (CDC), Lorri Cameron (Michigan Department of Community Health), Josh Foster (CIRC), Ben McMahan (CLIMAS), Elisa Petkova (CCRUN),Chip Konrad (CISA, Southeast Regional Climate Center), Juli Trtanj (NOAA CPO)

Session Summary

RISAs are involved in a variety of activities related to climate and human health, including: conducting research to assess impacts and vulnerabilities; developing tools, resources, and information for decision-makers; and engaging with stakeholders to identify needs and provide climate information for planning efforts. Session presentations represented five RISA-supported projects (located in Arizona, Michigan, North Carolina, New York, and Oregon) and overviews of CDC and NOAA climate-health programs and initiatives. Specific projects discussed in the session are assessing heat vulnerability in North Carolina, supporting climate change adaptation planning, informing emergency management efforts, and identifying flooding and related risks due to high precipitation events.

The relationship between health and climate is a complex issue spanning regional to local scales, and is challenging to address due to the different time frames of interest and scales at which data are available. Furthermore, as impacts can be non-linear and delayed, projects need to take a holistic view of climate and health interactions.

Health decision-makers operate on fairly short timeframes (<2 years) and are most interested in historic climate trends and identifying the important climate drivers of health impacts. While stand-alone climate change projections (which look out 50- to 100 years) may be less useful for decision-making, they could be useful for planning if used in conjunction with other information and tools (e.g. historical data, vulnerability assessments).

Recommendations

- While the climate impacts on health is an important topic and is being addressed by a variety of projects and programs, the extent of existing activities does not meet the overall need. Work to develop heat early warning systems has made considerable progress; however, additional support is needed to address other aspects of climate-health impacts, e.g. water- and vector-borne diseases, mental health, tribal cultural impacts, and linkages to underlying social vulnerabilities and disparities.

- Other research recommendations include: identifying region- and locally-specific thresholds; assessing relationships between climate and health variables; and evaluating effective community education, risk communications, and messaging of watches and warnings during and after extreme events.

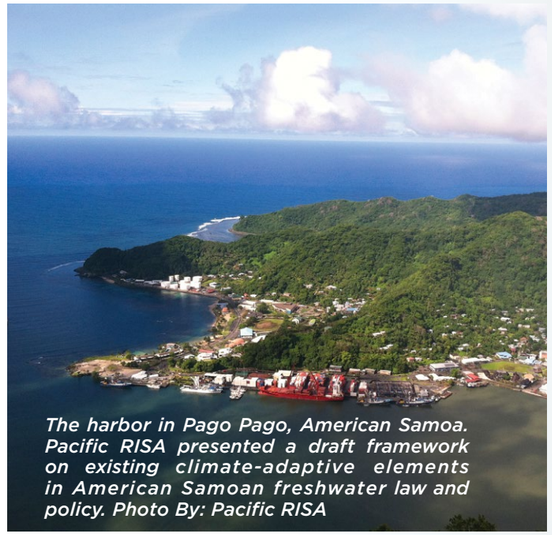
EXPLORING INTEGRATION

Recommendations Continued

- Other research recommendations include: identifying region- and locally-specific thresholds; assessing relationships between climate and health variables; and evaluating effective community education, risk communications, and messaging of watches and warnings during and after extreme events.

Science and data integration:

- Increase support for more environmental and public health monitoring data and surveillance systems, improved access to health data, and scaling of climate information and data to make it appropriate for health decision-making. Researchers and decision-makers often find it difficult to access health (and related) data. CDC can assist with some data access and provide technical assistance; however, many health datasets are restricted due to health privacy laws and dual use security concerns.



The harbor in Pago Pago, American Samoa. Pacific RISA presented a draft framework on existing climate-adaptive elements in American Samoan freshwater law and policy. Photo By: Pacific RISA

Integration across communities

- RISAs can be appropriate partners in developing climate-health resources and information, mapping and assessing vulnerabilities, working with health departments and planners to identify and support interventions and disseminating information that works best for a particular location or region.
- CDC BRACE programs and RISA teams are encouraged to collaborate. Some RISA projects are already connected with CDC BRACE programs; others should try to connect with these programs where applicable. Because there is limited funding available from both health and climate sources, working with partners can help to leverage available resources and expertise.
- The CDC could provide more information about "communities of practice" to facilitate exchange of information among researchers and stakeholders, particularly in regions where BRACE programs do not exist.
- RISAs should also look for opportunities to help integrate "climate and health" into other local planning efforts, such as emergency management and disaster preparedness and response. Such activities may catalyze additional, and more comprehensive, planning efforts as RISAs and local partners build relationships and capacity to develop new approaches.

CONCLUSION AND SUMMARY OF RECOMMENDATIONS

The 2015 RISA Annual Meeting provided opportunities for RISA teams and other partners to share information, develop ideas and collaborations, and build community. In its focus on partnerships and bringing together the RISA community, the 2015 Annual Meeting served to also build and strengthen bridges between the RISA community and regional, sectoral and national-level partners. The three meeting themes: usable science, regional partnerships, and integration highlighted ongoing RISA work at the forefront of interdisciplinary research connecting science to decision-making.

Each session produced a set of recommendations, relevant to individual RISA teams, the RISA network, NOAA, and external partners, which are summarized below.

Recommendations for RISA teams or researchers

- Identify what can be evaluated internally and what requires an external evaluator.
- When considering evaluation, first define what elements need to be evaluated and at what scale (individual project, program, or processes).
- Enable and promote student interaction among those involved in RISA research through a student and/or early career scientist listserv or other mechanism.
- Develop short courses for graduate students who are in programs that do not provide opportunities for training in conducting research focused on user needs.
- Develop a set of core tenets for training the next generation of use-inspired climate researchers.
- Find ways of writing proposals where time for partnerships is adequately resourced and valued by funding agencies.
- Future RISA efforts should further evaluate the information needs of their diverse stakeholders in order to provide information in a format that is both trusted by the stakeholders and directly related to their individual needs.
- RISA groups should collaborate to better communicate existing efforts in coastal areas, what has been learnt from this research, and specific properties that make coastal communities unique and worthy of attention and resources.
- CDC BRACE programs and RISA teams should collaborate and leverage available resources and expertise.
- RISAs can be appropriate partners in developing climate-health resources and information, mapping and assessing vulnerabilities, working with health departments and planners to identify and support interventions and disseminating information that works best for a particular location or region.
- RISAs should also look for opportunities to help integrate "climate and health" into other local planning efforts, such as emergency management and disaster preparedness and response.

CONCLUSION AND SUMMARY OF RECOMMENDATIONS

Recommendations for the RISA Program

- Share resources on programs, curriculum, and syllabi, through a RISA website.
- Continue creating and supporting opportunities for cross-agency collaboration and discussion.
- Agencies and programs involved in applied or user-inspired climate science research can identify shared outcomes that can be evaluated across programs, as well as program-specific outcomes.

Sampling streams in American Samoa.
Photo By: Chris Schuler

- Agencies and programs involved in applied or user-inspired climate science research should work closely together to develop a common framework for evaluation metrics that can be modified as needed for individual programs, projects, and deliberative co-production research processes.
- Continue to support the development of and experimentation with visualization software and tools to communicate relevant information to stakeholders.
- Continue to support the development of research focused on understanding how to shape research design aimed at producing useful information.
- Continue to support the development of evaluation programs for RISAs and their research efforts.
- Set-up a cross RISA disaster response team.

CONCLUSION AND SUMMARY OF RECOMMENDATIONS

Other recommendations

- Ensure resources posted to the Climate Resilience Toolkit (toolkit.climate.gov), Digital Coast (http://coast.noaa.gov/digitalcoast/), Climate.gov, and other websites are cross-linked when appropriate.
- Expand activities in the area of climate impacts on human health to better meet the societal need for such research.
- Increase support for more environmental and public health monitoring data and surveillance systems, improved access to health data, and scaling of climate information and data to make it appropriate for health decision-making.
- The CDC could provide more information about “communities of practice” to facilitate exchange of information among researchers and stakeholders, particularly in regions where BRACE programs do not exist.

Congaree River
Photo By: Chandler Green

Appendix A

ANNUAL MEETING PARTICIPANT LIST

Last Name First Name	*Affiliation*
Andresen, Jeffrey	Great Lakes Integrated Sciences and Assessments (GLISA), Michigan State University
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Horton, Radley	CCRUN, Columbia University/NASA GISS

Appendix A

ANNUAL MEETING PARTICIPANT LIST

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Wallace, Emily	NOAA
Woodhouse, Connie	CLIMAS, University of Arizona

Appendix B

MEETING AGENDA

Day 1 - Tuesday, January 13, 2015

8:00 - 9:00 am Welcome and Introductions.....(Carolina A)
Facilitator – Phil Mote, CIRC
- Wayne Higgins (Director, NOAA Climate Program Office)
- Adam Parris (RISA Program, NOAA Climate Program Office)

9:10 - 11:30 am Learning Networks & Evaluation.....(Carolina A)
Facilitator - Tamara Wall, CNAP
- 9:10 - 9:50 Melissa Finucane, Victoria Keener, & Laura Brewington (Pacific RISA)
- 9:50 - 10:50 Meg Hargreaves (Mathematica)
- 10:50 - 11:30 Discussion

11:30 - 1:00 pm Lunch and Networking (provided) .....(Carolina B)

1:00-2:30 pm Training the Next Generation of RISA .....(Carolina A)
Facilitator - Dan Ferguson, CLIMAS
- 1:00 - 1:15 Gregg Garfin (CLIMAS)
- 1:15 - 1:30 Jeff Andresen and Beth Gibbons (GLISA)
- 1:30 - 1:45 Dan Ferguson (CLIMAS)
- 1:45 - 2:00 Connie Woodhouse (CLIMAS)
- 2:00 - 2:30 Discussion

2:30-3:00 pm Break and Networking

3:00 - 5:00 pm Regional Partnerships .....(Carolina A)

3:00-4:00 Why Regional Partnerships?
Facilitator – Caitlin Simpson, NOAA
- 3:00-3:15 Kelly Redmond (CNAP, WRCC, DRI)
- 3:15-3:30 Jim Buizer and Lisa Goddard (International Research and Applications Program)
- 3:30-4:00 Discussion

4:00-5:00 Partnership Models
Facilitator – Claudia Nierenberg, NOAA
- Partnership Models (panel, short remarks and discussion)
  - NIDIS (Claudia Nierenberg NIDIS, Hope Mizzell SC Dept. of Nat. Res. & State Clim.)
  - Digital Coast (Lori Cary-Kothera NOAA, Jim Schwab APA)

Day 2 - Wednesday, January 14, 2015

8:00 - 9:00 am Breakfast and Networking.....(outside of Carolina A)

9:10 - 11:30 am Regi onal Partnerships (working session).....(Carolina A)
Facilitator - Beth Gibbons, GLISA

9:10-11:00

Breakout 1: Building successful Regional Coordination Efforts.....(Carolina A)
Breakout 2: Framing Cross-Regional Challenges.....(Calhoun)

11:05-11:30

Report out (all).....(Carolina A)

Appendix B

MEETING AGENDA

Day 2 - Tuesday, January 14, 2015

11:30 - 1:00 pm Lunch and Networking (provided) .....(Carolina B)

1:00 - 2:30 pm Usable Science .....(Carolina A)
Facilitator - Bets McNie, WWA
- 1:00 - 1:15 Dan Ferguson (CLIMAS)
- 1:15 - 1:30 Denise Lach (CIRC)
- 1:30 - 1:45 Hal Needham (SCIPP)
- 1:45 - 2:00 Bets McNie (WWA)
- 2:00 - 2:30 Discussion (all)

2:30 - 3:00 pm Break and Networking

3:00 - 5:15 pm Exploring Integration (concurrent)

1) Coastal Climate Resilience .....(Carolina A)
Facilitator - Shelby Krantz, SECC
- 3:00 – 3:05 Introduction, Shelby Krantz (SECC)
- 3:05 - 3:20 Liz Fly (CISA and SC Sea Grant)
- 3:20 - 3:35 Paul Conrads (USGS SC Water Science Center)
- 3:35 - 3:50 Jessica Bolson and Shana Jones (SECC)
- 3:50 - 4:05 Troy Hartley (VA Sea Grant)
- 4:05 - 4:20 Phil Mote (CIRC)
- 4:20 - 4:35 Sarah Trainor (ACCAP)
- 4:35 - 4:50 Mary Culver (NOAA Office for Coastal Management)
- 4:50 - 5:15 Discussion

2) Climate and Health .....(Calhoun)
Facilitator - Kirsten Lackstrom, CISA
- 3:00 - 3:05 Introduction, Kirsten Lackstrom (CISA)
- 3:05 - 3:20 Paul Schramm (CDC)
- 3:20 - 3:35 Lorri Cameron (MI Dept of Community Health)
- 3:35 - 3:50 Josh Foster (CIRC)
- 3:50 - 4:05 Ben McMahan (CLIMAS)
- 4:05 - 4:20 Elisa Petkova (CCRUN)
- 4:20 - 4:35 Chip Konrad (SECC)
- 4:35 - 4:50 Juli Trtanj (NOAA)
- 4:50 - 5:15 Discussion

5:15 - 5:30 pm Closing thoughts and wrap-up .....(Carolina A)

7:00 - 9:00 pm Networking Event .....(Stars Restaurant)

Address: 495 King Street Charleston, SC 29403

Day 3 - Thursday, January 15, 2015

8:45am Coffee and breakfast available .....(Outside of Carolina A)
- 9:30 – 10:30 Session leads meet to discuss workshop report
- 9:00 – 12:00 Carolina A will be available for informal side meetings and discussion, including visits from staff of the NOAA Office for Coastal Management.

Appendix C

REGIONAL PARTNERSHIPS WORKING GROUPS

The Regional Partnerships session of the RISA Annual Meeting included breakout discussions for participants to gather in small groups with either other participants from across one region or from multiple regions focused around a specific topic. Working group topics were solicited from RISA teams in advance of the meeting and included:

- Coastal vulnerability and meeting the needs of Indigenous communities (cross-regional)
- Extreme weather and climate events (cross-regional)
- Coordinating science and communication on future climate information (cross-regional)
- Drought preparedness and information (cross-regional)
- Drought preparedness and information (California-Nevada and surrounding areas)
- Southeast region coordination
- Loss of winter – Great Lakes region

Coastal vulnerability and meeting the needs of Indigenous communities

Discussion Summary:

Many RISA teams work with tribes and indigenous communities; ACCAP's region alone includes over 350 tribes. In order to address the climate-related concerns of the diversity of Indigenous communities in various regions, resources need to be strategically applied and RISAs need to learn from each other's efforts. While diversity of approaches and appreciation for that diversity is essential, it is also important to find similarities that can be leveraged and sharable lessons in order to get people the assistance and information that they need.

Key lessons:

- The challenge of meeting constituent needs is considerable; needs are great and resources are limited. Building capacity to cope with climate variability and change within these communities is a valuable approach to scaling this work to meet this challenge.
- RISA teams can work with Indigenous communities and community members to create a vision of their own resilience and find methods for developing the capacity to move toward that vision.

Extreme weather and climate events

Discussion Summary:

The RISA community can play a key role as information concierge or a trusted broker of resources and information. Additionally, the RISA network could be activated to share lessons and experiences across a region and cross-regionally. When thinking about extreme events and disaster response there are unlikely collaborators whose expertise could be tapped, including departments of transportation, agencies on aging, utility companies, and health institutions.

Key lessons:

- The RISA community should continue to share knowledge of responses to previous extreme events (e.g. Hurricane Sandy, Colorado flooding).
- The community should organize the development of teams to assist in leveraging the knowledge of the community in the wake of disasters. This could include a disaster management team and a cross-RISA Rapid Response team.

Appendix C

REGIONAL PARTNERSHIPS WORKING GROUPS

Coordinating science and communication on future climate information

Discussion Summary:

This cross regional discussion highlighted the need for interagency coordination and understanding of the roles of various entities. It also raised the challenge of how to collaborate when agency regions do not always align with one another. Diversity of audiences and the need for language that resonates with specific sectors, scales, and interests were also identified as challenges, as in other discussion groups.

Key Lessons:

- Taking advantage of technology is essential for sharing information, ensuring a 'no wrong door' policy, and building collaborations across space.
- There are a lot of resources and a lot of information currently available. The challenge really lies in making sure end-users can find the resources and are connecting with those resources most relevant to them.

Drought Preparedness and Information

Discussion Summary

This discussion group looked at the topic area from a national-level perspective, with members from Pacific RISA, NIDIS, USDA, US Army Corps of Engineers, and the American Planning Association. The conversation centered on what can be done to improve preparedness broadly, when working with stakeholders and decision-makers.

Key Lessons:

- Better communication of uncertainty is a need.
- Understand social networks, find trusted sources and boundary agents and work through them.
- Recognize that groups that may seem naturally suited to communicate and coordinate together do not always do so, so building those bridges is important.

Drought Preparedness and Information (California-Nevada and surrounding areas)

Discussion Summary

This discussion group expanded from drought management in California and Nevada to a broader discussion on collaboration between areas in the arid West. As many other teams discussed, there is a desire to identify how best to leverage agency resources for research, translation, outreach, and other needs.

Key lessons:

- There need to be stronger relationships between those working in the West, especially the RISAs, LCCs, and newly emerging USDA Regional Climate Hubs.
- The region needs a needs assessment to better understand what information is needed to assist in drought planning.
- The USDA Hubs could add tremendous value disseminating information, especially as they represent a trusted entity to ranchers and the agricultural community.

Appendix C

REGIONAL PARTNERSHIPS WORKING GROUPS

Southeast Region Coordination

Discussion Summary:

This group, which numbered approximately 25 people included representatives from SCIPP, SECC, CISA, and regional USDA, RCCs, CSC, and LCC representatives. This session marked the first time that this whole group has met, which was widely recognized as a valuable meeting in and of itself and much of the time was spent on introductions and considering the question of agency roles and responsibilities. Since the RISA Annual Meeting, this group has reconvened at forums such as the National Adaptation Forum in March 2015.

Key Lessons:

- Partnerships take time; even though this was just a conversation, it is a start to understanding others' stressors, capabilities, what you can share, lessons, etc.
- There is an interest in developing a regional climate adaptation conference.
- In the context of extreme events the most logical intervention point is to focus on local impacts, versus the climate change science at the national or global scale.

Loss of winter - Great Lakes Region

Discussion Summary:

This discussion group brought together members of GLISA and Regional Climate Center directors from the Midwest and Northeast. Critical impacts from winter warming are expected to affect tourism, shipping, agriculture, and timber industry. The group discussed that though there may be changes, they do not need to all be characterized as bad or harmful. However, indigenous populations are specifically at risk from loss of cultural and natural resources due to shifts in land and lake flora and fauna.

Key Lessons

- We need to use quantifiable data to verify the qualitative experiences across the region.
- Not all changes are negative, and communication and resources need to reflect that reality.
- We need to develop a strategic vision for collaborations across the region.

ACKNOWLEDGEMENTS

We gratefully acknowledge session leads, RISA investigators, and meeting participants for their roles in making the meeting a vibrant, interesting, and successful exchange. Adam Parris led the development of the Annual Meeting and, with the session leads, ensured that the meeting would address issues critical to the RISA program. Session leads volunteered their time and expertise to develop sessions that highlighted the work of the RISA teams and their partners beautifully and provided the fodder for many fruitful discussions. We would also like to thank Kathie Dello for her work on coordination of the meeting, and Melanie Russ from UCAR for her help with planning and logistics for the meeting. For the production of this report, thanks go to Amrith Sagar, Chelsea Combest-Friedman, and the Communications and Education group of CPO.

Finally, we are grateful for the continued contributions of the RISA teams to building adaptive capacity across the nation.

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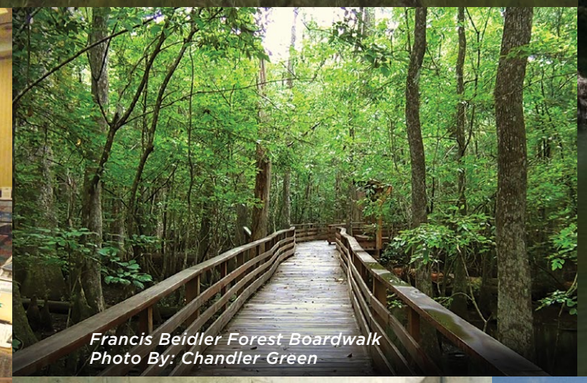
PHOTO GALLERY

Congaree River
Photo By: Chandler Green

The Daniel Island Connector in Charleston, South Carolina. Photo By: Chandler Green

The Fonte Dam was the first US built water control structure in Guam. Constructed in 1910, it and other structures help to minimize flash flood damage associated with typhoons. Fewer, but more intense typhoons are predicted to impact Guam under future climate conditions.
Photo By: Victoria Keener

2014 Carolina's Climate Resilience Conference



Francis Beidler Forest Boardwalk
Photo By: Chandler Green

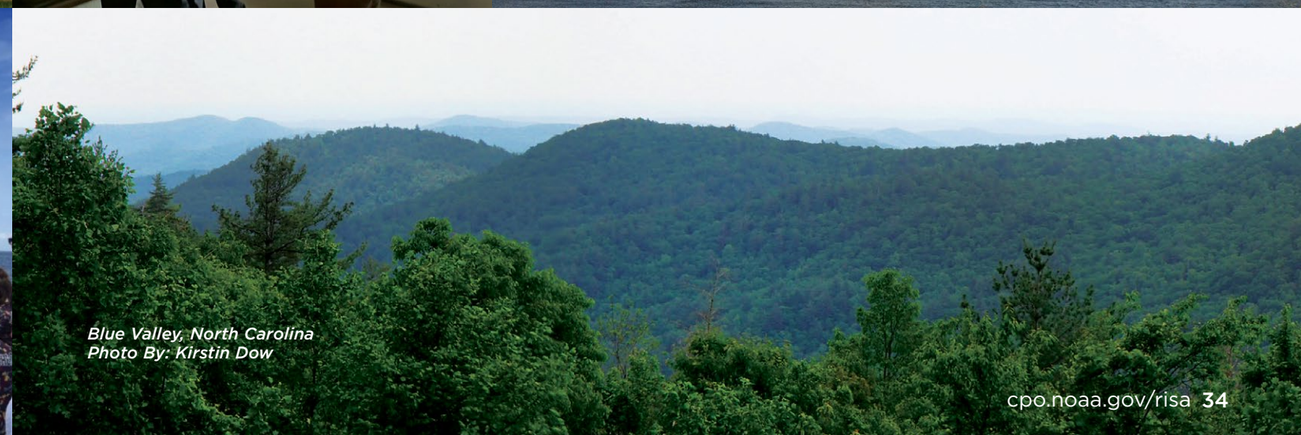
A native ohia lehua tree overlooks the Pearl Harbor watershed in Oahu, Hawaii. How future climate will impact the Pearl Harbor watershed is critical for regional security infrastructure, agriculture, tourism, native ecosystems, and freshwater supply.
Photo By: Victoria Keener

SCIPP Summer interns Derrick Jones and Alex Nongard stand by the 1984 HistoricTulsa flood marker. Photo By: Tim Lovell.

Derrick Jones ,Commissioner Todd Kilpatrick, and Charles Ely from KTUL Channel 8 news discuss the history of the Tulsa levee system and the state of the pump houses, which are indisrepair. Photo By: Alex Nongard.

Leone Bay
Photo By: Pacific RISA

Barry Keim simultaneously describing the New Orleans flood protection infrastructure while not falling in Lake Pontchartrain!
Photo By: Alek Krautmann



Blue Valley, North Carolina
Photo By: Kirstin Dow

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Regional Integrated Sciences and Assessments

cpo.noaa.gov/risa